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Changes in prevalence of asthma and allergy in Swedish school children over almost three decades and factors reducing risk of allergy

Akademisk avhandling

som för avläggande av medicine doktorsexamen vid Sahlgrenska akademin, Göteborgs universitet kommer att offentligen försvaras i Drottning Silvia barn- och ungdomssjukhus, hörsal Tallen, Rondvägen 10, Göteborg, den 8 oktober 2021, klockan 09.00

av Anna Hicke-Roberts

Fakultetsopponent: Professor Lennart Nilsson, Linköpings Universitet

Avhandlingen baseras på följande delarbeten

I. Hicke-Roberts A, Åberg N, Wennergren G, Hesselmar B. Allergic rhinoconjunctivitis continued to increase in Swedish children up to 2007, but asthma and eczema levelled off from 1991. Acta Paediatr. 2017 Jan; 106 (1):75-80.

II. Hesselmar B, Hicke-Roberts A, Wennergren G. Allergy in children in hand versus machine dishwashing. Pediatrics. 2015 Mar; 135 (3):e590-7.

III. Hesselmar B, Hicke-Roberts A, Lundell AC, Adlerberth I, Rudin A, Saalman R, Wennergren G, Wold AE. Pet-keeping in early life reduces the risk of allergy in a dose-dependent fashion. PLoS One. 2018 Dec; 19;13(12):e0208472.

IV. Hicke-Roberts A, Wennergren G, Hesselmar B. Late introduction of solids into infants' diets may increase the risk of food allergy development. BMC Pediatr. 2020 Jun 3; 20(1):273.

SAHLGRENSKA AKADEMIN

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Changes in prevalence of asthma and allergy in Swedish school children over almost three decades and factors reducing risk of allergy

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Abstract

Background: The prevalence of allergic diseases increased dramatically during the last decades of the twentieth century. The reason behind this increase is still not fully understood.

Aim: The aim of the thesis was to investigate changes over time in the prevalence of asthma and allergy in two Swedish towns, and to identify protective and risk factors for allergy development.

Methods: Data were obtained from two studies: a cross-sectional study that was used in all four papers, and in paper III results from a birth cohort study was added. The cross-sectional study (N=1029) was performed in 2007 and data were compared with two previous cross-sectional studies from 1979 and 1991. All three studies were based on questionnaires with the same set of questions on asthma and allergy, the children were of the same age and from the same two Swedish towns: Mölndal/Gothenburg and Kiruna. Questions on diet and food allergy were added in 2007 study. The birth cohort study (N=249), used in paper III, recruited children from Västra Götaland county. The children were recruited at birth, between 1998 and 2005, and they were clinically assessed at the age of 8-9 years.

Results: Paper I: The prevalence of asthma were 2.5% (1979), 5.7% (1991) and 7.1% (2007), allergic rhino-conjunctivitis: 5.5% (1979), 8.1% (1991) and 11.1% (2007), eczema 7.1% (1979), 18.3% (1991) and 19.7% (2007) respectively. Allergic rhino-conjunctivitis continued to increase from 1979 to 2007, while asthma and eczema levelled off between 1991 and 2007. Having both parents born abroad was a protective factor for developing allergy. Paper II: Hand-dishwashing decreased the risk of allergy (odds ratio 0.57; 95% confidence interval 0.37-0.85). The risk was reduced in a dose-response pattern if the child was also served fermented food, and if the family bought food directly from a farm. Paper III: Keeping cats and dogs during the first year of life was associated with a decreased risk of allergy in a dose-dependent manner. Sensitisation to animals and pollen also decreased with an increasing number of cats and/or dogs kept indoors. Paper IV: The total cumulative incidence of self-reported food allergy was 19.6%, and it was significantly higher in Kiruna (28.5%) than in Mölndal (15.7%). Introducing solids from 7 months of age or later, and a mother's history of allergy, were both independent risk factors for developing food allergy. Solids were introduced at a later age in Kiruna.

Conclusion: The rising trend of allergic diseases in children seemed to level off, with the exception of allergic rhino-conjunctivitis. Both dishwashing by hand, eating fermented food and buying food directly from farms were protective factors, as was the keeping of indoor pets during the first year of life. With pets, the risk of allergy was reduced in a dose-dependent pattern. Of the identified risk factors, introducing solids late to an infant's diet increased the risk of food allergy, as did a maternal history of allergy.

Keywords: allergy, children, epidemiology, risk factors, protective factors

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